

**BY ORDER OF THE COMMANDER
AIR FOR MATERIEL COMMAND**



AIR FORCE INSTRUCTION 21-103

**AIR FORCE MATERIEL COMMAND
Supplement**

ADDENDUM_E

12 SEPTEMBER 2016

Maintenance

**EQUIPMENT INVENTORY, STATUS
AND UTILIZATION REPORTING
SYSTEM/F-22 MINIMUM ESSENTIAL
SUBSYSTEM LIST (MESL)**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

ACCESSIBILITY: Publications and forms/IMTs are available for downloading or ordering on the e-publishing website at www.e-Publishing.af.mil

RELEASABILITY: There are no releasability restrictions on this publication

OPR: HQ AFMC/A4MM

Certified by: HQ AFMC/A4M
(Col Scott T. Fike)

Supersedes: AFI21-103_AFMCSUP_
ADDENDUM_E,
18 October 2011

Pages: 7

This instruction implements AFI 21-103_AFMCSUP, *Equipment Inventory, Status and Utilization Reporting*. It establishes guidance and assigns responsibility to provide AFMC Test Fleet aircraft status changes/updates in accordance with (IAW) current maintenance conditions and the developed MDS specific mission essential subsystem list (MESL). This instruction applies to all AFMC organizations that manage or perform maintenance on AFMC owned/possessed aircraft regardless of Air Force Specialty Code. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). This publication may be supplemented at any level, but all direct Supplements must be routed to the Office of Primary Responsibility (OPR) of this publication for coordination prior to certification and approval. The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0, T-2, T-3") number following the compliance statement. See AFI 33-360, Publications and Forms Management, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-tiered compliance

items. Send comments and suggested improvements to this instruction on AF Form 847, ***Recommendation for Change of Publication***, to HQ AFMC/A4MM, 462 Chidlaw Road, Wright-Patterson AFB OH 45433-5006.

These MESLs complement AFI 21-103, *Equipment Inventory, Status, and Utilization Reporting*. They apply to maintenance activities supporting AFMC test missions across AFMC.

SUMMARY OF CHANGES

This publication has been substantially revised to meet the intent of AFI 21-103 AFMCSUP; this Addendum must be reviewed in its entirety. The MESL is modified based on user inputs and has been updated to reflect current mission requirements. Additionally, removed Tier 1 (T-1) IAW AFI 33-360 dated 1 December 2015, MAJCOM level instruction will not Tier references above the MAJCOM waiver authority (e.g. Table 1.1. Tier Waiver Authorities, Tier T-1 may be used in publications at Departmental level only.).

1.1. **General.** The MESL is the basis of status reporting IAW 21-103. MESLs lay the ground work for reporting the status of assigned/possessed AFMC test fleet aircraft and equipment supporting AFMC test missions. They list the minimum essential systems and subsystems that must work on test fleet aircraft to perform specifically assigned unit test, training, or other missions.

1.2. **Qualifying notes are:** Used to define system exceptions and help explain complex degraded mission systems.

1.3. **It is understood that:** Any aircraft or support equipment system or subsystem may be subjected to test or tested under a test scenario and/or are test dependent as directed by the test mission director. If identified by test mission director, those systems or subsystems, if not already identified by qualifying notes, must be operational to be considered FMC or PMC for that mission.

2.1. **Reading the MESL.** A MESL is read by comparing the systems stated by WUC column (column 2) against the Full Systems List (FSL) and all applicable Basic Systems List (BSLs) across the page (DTE - Developmental Test and Evaluation, DTS - Developmental Test Support, BFT/NT/TT - Training). Each unit's Design Operational Capability (DOC) statement determines applicability of BSL columns. The aircraft or equipment MESLs incorporates all AFMC assigned/possessed aircraft/equipment and therefore it is important to compare only the columns listed in the MESL which are applicable to the unit's assigned/possessed aircraft. For example, units with training (TF) coded aircraft would determine report status using only the FSL and TNG columns. Units with multiple coded aircraft will ensure status is reported using the MESL columns appropriate to the individual aircraft/equipment assignment code or type mission being flown. (T-2).

Table 2.1. F-22A Minimum Essential Subsystem Listing (MESL)

NO.	LCN	SYSTEM/SUBSYSTEM	FSL (See Note 16)	BSL		
				DTE (See Note 16)	DTS (See Note 16)	BFT/NT/ TT (See Note 16)
1.	A2100	Air Conditioning	X	X	X	X
2.	A2400	Electrical Power	X	X	X	X
3.	A2500	Equipment/Furnishings	X	X	X	X
4.	A2600	Fire/Overheat	X	X	X	X
5.	A2700	Flight Controls	X	X	X	X
6.	A2800	Fuel System	X	X	X	X
7.	A2900	Hydraulic Power	X	X	X	X
8.	A3000	Ice & Rain Protection	X	X	X	X
9.	A3100	Indicating & Recording	X	X	X	X
10.	A3132	Recorder Video	X	X	X	X
11.	A3200	Landing Gear	X	X	X	X
12.	A3300	Lighting	X	X2	X2	X2
13.	A3400	Navigation	X	X	X	X
14.	A3500	Oxygen	X	X	X	X
15.	A3600	Pneumatic Systems	X	X	X	X
16.	A4200	Integrated Avionics	X	X	X	X
17.	A4230	MFD	X	X3	X3	X3
18.	A4600	Vehicle Management System (VMS)	X	X	X	X
19.	A4800	Comm/Nav/Identification (CNI)	X1	X1	X1	X1
20.	A4816	ACMI	X	X		
21.	A4817	IFDL	X14	X14	X14	X14
22.	A4818	GINs (if equipped)	X	X	X	X
23.	A4819	ILS	X	X5	X5	X5
24.	A4900	Aux Power	X	X	X	X
25.	A5100	Low Observables	X	X11	X11	X11
26.	A5200	Doors	X	X	X	X
27.	A5300	Fuselage	X	X	X	X
28.	A5500	Stabilizer	X	X	X	X
29.	A5600	Canopy System	X	X	X	X
30.	A5700	Wings	X	X	X	X
31.	A7100	Power Plant	X	X	X	X
32.	A7200	Engine Assembly-Turbofan	X	X	X	X
33.	A7300	Engine Fuel Controls	X	X	X	X
34.	A7400	Engine Electrical/Ignition	X	X	X	X

35.	A7500	Engine Tubes Manifolds	X	X	X	X
36.	A7600	Engine Controls	X	X	X	X
37.	A7700	Instrumentation/sensors	X	X	X	X
38.	A7800	Engine Nozzle Module	X	X	X	X
39.	A7900	Engine Oil System	X	X	X	X
40.	A8000	Engine Starting System	X	X	X	X
41.	A8300	Accessory Gearbox	X	X	X	X
42.	A9400	Weapons	X	X6,7,8	X6,7,8	X6,7,8
43.	A9450	Gun System	X	X9	X9	X9
44.	A9470	Radar(4th Gen 9480)	X	X	X	X
45.	A9500	Crew Escape & Safety	X	X	X	X
46.	A9900	EW	X	X12	X12	X12
47.	A9910	RW/NBLIST	X13	X13	X13	X13
48.	A9920	IRCM/EXCM	X15	X15	X15	X15
49.	A9950	MLD	X10	X10	X10	X10

Table 2.2. Qualifying Notes.

1.	Both radios must have full functionality (UHF, VHF, secure, Have Quick) for FMC. Both radios must have partial capability; one (1) UHF and one (1) VHF or one (1) radio must be fully functional for PMC.
2.	Exterior lighting required per AFI 11-202V3, <i>General Flight Rules</i> .
3.	Two (2) of three (3) operational secondary MFD's required for PMC.
4.	ACMI inop is PMC.
5.	ILS inop is PMC.
6.	If ARIP is installed on station 9, then remaining seven (7) stations required for FMC. Any combination of five (5) to include a minimum of one (1) Aim 9M station required for PMC.
7.	All four (4) external weapons stations required for FMC. Any combination of three (3) required for PMC.
8.	Only six (6) internal weapons stations are available in Air-to Ground configuration. All six (6) stations required for FMC. One (1) AIM-9M station may be inoperative for PMC.
9.	Gun system integrity required for FMC. Inoperative gun system is PMC. Exception: F-22 aircraft tail number 06-4132 may be considered FMC for DTE missions. Gun System integrity is not required on F-22 aircraft tail numbers 91-4006, 91-4007, and 91-4009.
10.	All six (6) MLD sensors required for FMC. Five (5) of six (6) required for PMC.
11.	The LO system will be considered fully mission capable when the Signature Assessment System (SAS) identifies radar cross-section (RCS)-margins-used as less than 100%. When SAS RCS-margin is greater than 100%, the aircraft will be PMC-Airworthy as long as un-repaired LO damages do not affect structural integrity and/or Safety of Flight. On a case by case basis, aircraft may be considered NMC-Airworthy

	if aerodynamic-only finishes are approved by appropriate engineering disposition (in lieu of TOD approved finishes). Exception: F-22 Aircraft tail numbers 91-4006 may be considered FMC when SAS margins are 100% or greater for missions regardless of LO status.
12.	Not required for non-tactical training and most flight science missions.
13.	RW is PMC if RW Degrade FRC is confirmed by pilot comment of degraded system performance or presence of ICAW.
14.	IFDL low data rate is PMC if confirmed by pilot comment of degraded system performance, loss of one IFDL MBA is PMC.
15.	At least 90% of loaded expendables must Inventory for FMC.
16.	For FRCs that assert a system "Degrade" in conjunction with pilot observed performance degradation, the aircraft status will be reported as PMC. For FRCs that asserts a system "FAIL" in conjunction with pilot observed performance degradation, the aircraft will be reported as NMC.

DONALD E. KIRKLAND, Brigadier General, USAF
Director of Logistics, Civil Engineering and Force
Protection

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 11-202, Volume 3, *General Flight Rules*, 7 Nov 2014

AFI 11-218, *Aircraft Operations and Movement on the Ground*, 28 Oct 2011

AFI 21-101, *Aircraft and Equipment Maintenance Management*, 21 May 2015

AFI 21-103, *Equipment Inventory, Status and Utilization Reporting*, 26 Jan 2012

AFI 33-360, *Publications and Forms Management*, 1 Dec 2015

AFMAN 33-363, *Management of Records*, 1 Mar 2008

AFPD 21-1, *Air and Space Maintenance*, 29 Oct 2015

Prescribed Forms

There are no prescribed forms for this publication

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*, 22 Sep 2009

Abbreviations and Acronyms:

ACMI—Air Combat Maneuvering Instrumentation

AFMC—Air Force Materiel Command

AMRAAM—Advanced Medium-Range Air to Air Missile

ARIP—AVEL Replacement Instrumentation Package

AVEL—AMRAAM Vertical Ejection Launcher

BSL—Basic Systems List

CNI—Communication Navigation Identification

DOC—Design Operational Capability

DTE—Developmental Test and Evaluation

DTS—Developmental Test Support

ECM—Electronic Counter Measures

EW—Electronic Warfare

FMC—Full Mission Capable

FSL—Full Systems List

GPS—Global Positioning Inertial Navigation System

GPS—Global Positioning System

IAW—In Accordance With

ICAW—Integrated Cautions, Advisories, and Warnings

IFF—Identification Friend or Foe

ILS—Instrument Landing System

JHMCS—Joint Helmet Mounted Cueing System

LCN—Logistics Control Number

LO—Low Observable

MDS—Mission Design Series

MESL—Minimum Essential Subsystem List

MFD—Multi Function Display

MLD—Missile Launch Detector

NMC—Non-Mission Capable

OPR—Office of Primary Responsibility

PMC—Partial Mission Capable

RCS—Radar Cross-Section

SAS—Signature Assessment System

TCTO—Time Compliance Technical order

TNG—Training

TOD—Technical Order Data

UHF—Ultra High Frequency

VHF—Very High Frequency